Action Item No. B-8
NCDC/NWS Climate Services Partnership Meeting
April 20-22, 2005
Asheville, NC

Action Item No. B-8:

1. Coordinate regional and field input to NCDC for reasonable suggestions for changes to the Health of the Network (HoN) website (Kearns, Leffler/Berger; due 7-29-05)
2. Form a team for feedback, policy, and training related to HoN (Kearns/Leffler/Berger; due 7-29-05).
3. Develop a more user-friendly format for web display of HoN (Owen; 9-30-05).

Purpose: This activity addresses Action Item No. B-8, parts one and two as noted above. This documentation will be provided to Tim Owen (NCDC) upon finalization so that NCDC may complete action no. B-8, part 3 above.

Background: The National Climatic Data Center's (NCDC) Health of the COOP Network (HoN) web site is updated each month to assist COOP network program managers in identifying possible data discontinuities. The data are displayed via a web based system and provide information in the form of tables, graphs and maps.

As part of an effort to improve data quality control and the integrity of the climate record, NWS desires to make more effective use of existing NCDC products such as Health of the Network.

This effort documents the response to the action item No. B-8 parts 1 and 2, shown above.

1) NWS Regional and field suggestions to change HoN website:

    a. Reorganize website for ease of use
    b. Combine areas to eliminate redundancy
    c. Improve timeliness of data
    d. Provide snapshot views

2) Form a team for HoN feedback on policy and training:

    Team Members:

    Tim Kearns Chair, NWS Field Rep Central Region
    Helen Frederick NCDC Rep
    William Angel NCDC Rep
    George Cline NWS Field Rep Western Region
    Myron Berger NWS HQ Rep
    Bob Leffler NWS HQ Rep
    Mike Asmus NWS Southern Region Rep
    Sergio Marsh NWS Eastern Region Rep
    Susan Nelson NWS Western Region Rep

    Recommendations for Policy (Organizational Responsibilities):

NCDC: NCDC's Data Processing Branch will operationally distribute HoN statistics as appropriate.

HQ NWS: NWSH's Observing Services and Climate Services Divisions will develop NWS policy that documents NWS field operation responsibilities with respect to the use of HoN to protect the integrity of both real-time data and the climate record. Observations Services Division should have the lead as the NWS policy chapters dealing with data quality control (NWSI 10-1305, Surface Observing Program, (Land) Observational Quality Control - General) are the responsibility of this division. Climate Services Division should provide support as they have expertise in the climate related activities of data QC and are heavily involved in efforts to improve inter-line office and field data quality control activities in the interest of ensuring the integrity of the climate record.

Regional Offices: TBD

Weather Forecast Office/Data Collection Office:

Local offices should monitor the HoN web site to ensure the integrity of their local COOP data. Local Network Data Managers should review the HoN information, investigate, and take corrective action as appropriate for any of the following problems.

- Shifted data
- Missing data
- Missing stations
- Changes to the original temperature data of 5 degrees Fahrenheit or more
- Changes to the original precipitation data of 0.25 inches or more

TYPES OF REPORTS:

Each month, NCDC will compile three different levels of report for review by NWS data managers. The three types of reports are listed below along with a brief explanation of the level of Quality Control each type of reports receives.

Preliminary Report 1

This report will become available 15-20 days after the end of the month and will be based on NCDC's TD3201 data. TD3201 preliminary data are the result of the initial data entry process from sources such as ROSA, WXCODER, and IV-ROCS. As the data are received, data entry software checks for and resolves basic internal inconsistencies by performing some very low-level quality control.

Preliminary Report 2

This report will become available approximately 60 days after the end of the month and will be based on NCDC's TD3202 data. TD3202 preliminary data undergo additional quality control steps

over and above TD3201, in order to detect and remove precipitation outliers and key entry errors, and further resolve internal data inconsistencies.

Final Report

This report will be available approximately 110 days after the end of the month and will be based on NCDC's TD3200 data. TD3200 data are the final data and have undergone full quality control processing at NCDC. This includes interactive areal edits where stations are compared with nearest neighbor stations. It also includes manual outlier review. Resolutions to data discrepancies noted on this report should be reported via DATZILLA.

PROCEDURES:

For identifying shifted Data

From the Regional or State level of the Data Assurance Report menu, locate all stations listed for your WFO. Shifted temperature data is identified using the second number, in the series of three numbers listed under the Temperature Mx and Mn columns (for Max and Min). Shifted precipitation data is identified using the second number, in the series of three numbers listed under the Precipitation Rn and Sn columns (for Snow and Rain). For example, in the below Quality Assurance Report, Browns Valley MN has been identified as having shifted 27 maximum temperatures and 22 minimum temperature.

Cooperative Data Quality Assurance Report
For NWS Region: CENTRAL
December, 2004

Text Version

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Error Minimum=8								Identified Errors/Time Shifts/Missing			
FLAGGED Stations								Temperature		Precipitation	
WFO	ID	Data	Hist	Rprt	Grph	Station Name	ST	Mx	Mn	Rn	Sn
ABR	211063		MI3			BROWNS VALLEY	MN	29/27/ 0	25/22/ 0	0/ 0/ 3	0/ -/ -
ABR	218907		MI3			WHEATON	MN	29/29/ 0	29/29/ 0	0/ 0/ 0	1/ -/ -

To further investigate the shifted data problem, you can review the daily breakdown of data by selecting the (data) icon for the interested station on the Data Assurance Report menu. For example, the menu below

was generated by selecting the data icon from the row of Browns Valley, MN using the Data Assurance Report menu located above. This menu will assist the user by identifying the specific days the data was shifted.

NOTE…the sample menu below shows only a small portion of the entire menu.

STATION IDENTIFICATION

Coop ID	Station Name	State	Latitude	Longitude	Elevation
211063	BROWNS VALLEY	MN	45.593889	-96.827778	990

DATA VALUES

1	TMAX	2	Invalid data element (subsequent value replaces original)	33
1	TMAX	B	Time shifted value	41
2	TMAX	2	Invalid data element (subsequent value replaces original)	35
2	TMAX	B	Time shifted value	33
3	TMAX	2	Invalid data element (subsequent value replaces original)	47
3	TMAX	B	Time shifted value	35
4	TMAX	2	Invalid data element (subsequent value replaces original)	42
4	TMAX	B	Time shifted value	47

Once a station has been identified as a data shifter, the local NWS Data Manager should contact the observer and provide training on the proper method for recording data. The NWS Data Manager should review the following month's Preliminary 1 report to ensure corrective action has been taken and the observer is no longer shifting data.

For identifying missing data

From the Regional or State level of the Data Assurance Report menu, locate all stations listed for your WFO. Missing temperature data is identified using the third number, in the series of three numbers, listed under the Temperature Mx and Mn columns (for Max and Min). Missing precipitation data is identified using the third number, in the series of three numbers, listed under the Precipitation Rn and Sn columns (for Snow and Rain). For example, in the below Quality Assurance Report, Chamberlain Bridge, ME has been identified as having 14 missing maximum and minimum temperatures and 14 rain reports.

Cooperative Data Quality Assurance Report
For State: Maine
December, 2004

Text Version

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Error Minimum=8								Identified Errors/Time Shifts/Missing			
ALL Stations								Temperature		Precipitation	
WFO	ID	Data	Hist	Rprt	Grph	Station Name	ST	Mx	Mn	Rn	Sn
CAR	170100		MI3			ACADIA NATIONAL PARK	ME	2/ 0/ 0	5/ 0/ 0	2/ 0/ 1	0/ -/ -
CAR	171381		MI3			CHAMBERLAIN BRIDGE	ME	0/ 0/14	2/ 0/14	0/ 0/14	0/ -/ -

To further investigate the missing data problem, you can review the daily breakdown of data by selecting the (data) icon for the interested station on the Data Assurance Report menu. For example, the menu below was generated by selecting the data icon from the row of Chamberlain Bridge, ME using the Data Assurance Report menu located above. This menu will assist the user by identifying the specific days the data was missing. This sample shows there is no temperature data for the 6th, 7th, and 8th.

NOTE…the sample menu below shows only a small portion of the entire menu.

4	TMAX	0	Valid data element	23
5	TMAX	0	Valid data element	30
9	TMAX	0	Valid data element	33
10	TMAX	0	Valid data element	33
11	TMAX	0	Valid data element	30

There are a number of possible reasons for missing data; broken equipment, observers on vacation, business/offices closed on weekends and holidays, etc. NWS Data Managers should make every effort to eliminate missing data. Some possible solutions include; having observers find a back-up while they are on vacation, installing a NIMBUS (temperature recording unit) in business/offices that are closed on weekends and holidays, and rapidly responding to equipment outages. If the NWS Data Manager has access to missing data, they should open a DATZILLA report and provide the data to the appropriate agency.

For identifying missing stations

From Cooperative Network Graphing, Reporting, and Mapping Options Menu, select the State Options Menus. From the State Option Menu, select the appropriate State, then select the Missing Station Report option from the Output Options drop down box. Review the output taking note of the stations listed within your CWA. Pay particular attention to the section labeled “Last Data”. This date indicates the last time NCDC received data for the listed station. For example, in the Missing Stations Menu shown below, NCDC has not received data for the Chester 2N station since December 2004.

Cooperative Network Missing Stations
For State: South Dakota
February, 2005

Text Version

WFO	ID	Hist	Grph	Station Name	ST	Begin Date	Last Data
FSD	391636	MI3		CHESTER 2 N	SD	20011101	200412

Again, there are a number of possible reasons for a station showing up on the Missing Stations Report. The most common reason is the need for updated metadata. For example, an observer retires and a station is inactivated while a new observer is located; however, the WFO fails to submit a B-44 to inactivate. Since there was no B-44 submitted to inactivate the station, NCDC assumes it's still operating and reports the station as missing. When the reason for the above example (Chester 2N) showing up as missing was investigated, the problem was found to be an improper Station ID being reported on the B-91. In order to correct this problem, the WFO must correct the station ID on all the missing B-91s and send them to NCDC.

For identifying Changes to the original temperature data of 5 degrees Fahrenheit or more

From the Regional or State level of the Data Assurance Report menu, locate all stations listed for your WFO and further investigate any station that show temperatures errors that are NOT resulting from time shifting. For example, in the table listed below, Nashua 2 NNW shows 9 identified errors in the maximum temperature box that are not resulting from time shifting.

Cooperative Data Quality Assurance Report
For NWS Region: EASTERN
February, 2005

Text Version

Error Minimum=8								Identified Errors/Time Shifts/Missing			
FLAGGED Stations								Temperature		Precipitation	
WFO	ID	Data	Hist	Rprt	Grph	Station Name	ST	Mx	Mn	Rn	Sn

BOX	190593		*MI3*			BEVERLY	MA	25/24/ 0	3/ 0/ 0	0/ 0/ 0	0/ -/ -
BOX	191386		*MI3*			CHATHAM WSMO	MA	25/25/ 0	23/23/ 0	0/ 0/ 1	0/ -/ -
BOX	194711		*MI3*			MIDDLEBORO	MA	-/ -/ -	-/ -/ -	15/25/ 0	8/ -/ -
BOX	195175		*MI3*			NATICK	MA	26/26/ 0	22/21/ 0	16/16/ 0	8/ -/ -
BOX	275712		*MI3*			NASHUA 2 NNW	NH	9/ 0/ 0	6/ 0/ 0	0/ 0/ 3	0/ -/ -

This would require additional investigation to determine the problem. To do so, select the icon (data) in the row containing the Nashua 2 NNW information. The following information is displayed.

NCDC / Health of the Networks / U.S. In Situ / COOP / Data Listing

Cooperative Station Monthly Data Listing

Yearmonth: 200502

STATION IDENTIFICATION

Coop ID	Station Name	State	Latitude	Longitude	Elevation
275712	NASHUA 2 NNW	NH	42.78	-71.48	130

DATA VALUES

Day	Element	Flag	Description	Data Value
17	TMAX	2	Invalid data element (subsequent value replaces original)	57
17	TMAX	N)	Substitution of "3 nearest station mean"	40
18	TMAX	2	Invalid data element (subsequent value replaces original)	40
18	TMAX	N)	Substitution of "3 nearest station mean"	32
19	TMAX	2	Invalid data element (subsequent value replaces original)	40
19	TMAX	N)	Substitution of "3 nearest station mean"	27

NOTE…the sample menu above shows only a small portion of the entire menu.

In the above example, data for the 17th, 18th, and 19th were replaced with values using NCDC's 3 nearest station mean routine. These types of changes require further investigation to determine whether the substituted value is valid or the original value should be placed back into the database. When a WFO is seeing these types of errors for a particular location, they should consider several different possible causes; equipment exposure, malfunctioning equipment, and terrain influences are just a few. However, if after considering all possible causes the WFO believes the original data is correct, they should open a DATZILLA trouble ticket and be prepared to support their claim. If the WFO believes the data is correct and NCDC's 3 nearest station mean should not be used on a particular site due to local effects, the office should contact NCDC and ask them to add the station to the Spatial QC Exception List. Once again, be

prepared to support your decision for inclusion on the list. Remember, all substituted data that shows up on the final version of the HoN goes into the published data (TD3200).

For identifying Changes to the original precipitation data of 0.25 inches or more

From the Regional or State level of the Data Assurance Report menu, locate all stations listed for your WFO and further investigate any station that show precipitation errors that are NOT resulting from time shifting. For example, in the table listed below, Ashton 2S shows 3 identified errors in the precipitation column which require further investigation.

Cooperative Data Quality Assurance Report
For State: South Dakota
February, 2005

Text Version

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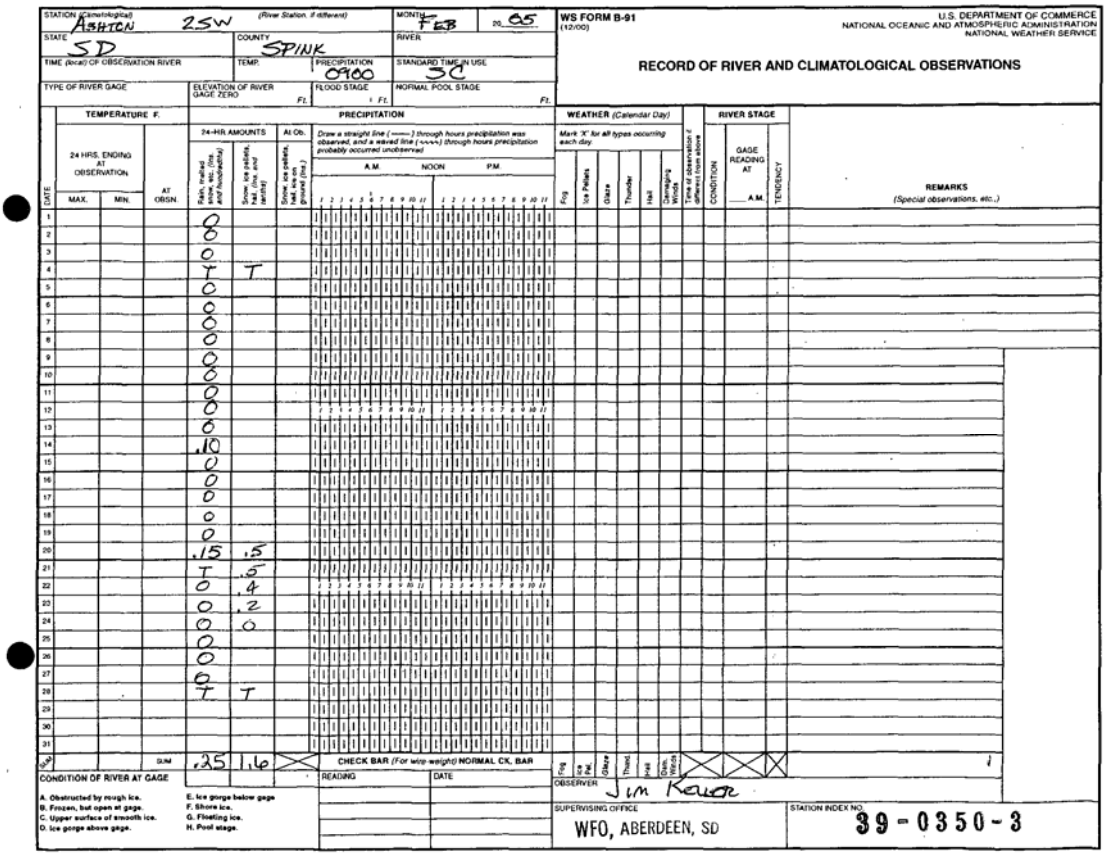
Error Minimum=8								Identified Errors/Time Shifts/Missing			
ALL Stations								Temperature		Precipitation	
WFO	ID	Data	Hist	Rprt	Grph	Station Name	ST	Mx	Mn	Rn	Sn
ABR	390020		MI3			ABERDEEN RGNL AP	SD	0/ 0/ 0	0/ 0/ 0	0/ -/ -	
ABR	390198		MI3			ANDOVER	SD	2/ 0/ 0	1/ 0/ 0	0/ 0/ 1	0/ -/ -
ABR	390306		MI3			ARTAS 1S	SD	-/ -/ -	-/ -/ -	0/ 0/ 0	0/ -/ -
ABR	390350		MI3			ASHTON 2S	SD	-/ -/ -	-/ -/ -	3/ 0/ 0	1/ -/ -

You can narrow down the problem by view additional information found on the Data Listing Menu. To access this menu, select the data icon from the row of information containing Ashton 2S data.

20	PRCP	0	Valid data element	0.15
21	PRCP	0 T	Valid data element	0.00
22	PRCP	3	Invalid data element (no replacement value follows)	0.00
23	PRCP	3	Invalid data element (no replacement value follows)	0.00
24	PRCP	3	Invalid data element (no replacement value follows)	0.00

25	PRCP	0	Valid data element	0.00
26	PRCP	0	Valid data element	0.00
27	PRCP	0	Valid data element	0.00
28	PRCP	0 T	Valid data element	0.00

In this particular case, NCDC noted an error, but did not have a replacement value; therefore, they left the value as reported (0.00). However, a closer look at the B-91 and discussions with the observer revealed an error in recording snow depth. The observer was reporting snow depth measurements to the nearest one tenth of an inch and incorrectly placing it in the snowfall column. Additional training was provided to the observer and a DATZILLA ticket was opened to correct the snowfall.



WS FORM B-91 (12/00)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE

RECORD OF RIVER AND CLIMATOLOGICAL OBSERVATIONS

STATION (Climatological) ASHTON 2.5W (River Station, if different) MONTH FEB 20 05
STATE SD COUNTY SPINK RIVER
TIME (local) OF OBSERVATION RIVER TEMP. PRECIPITATION 0900 STANDARD TIME IN USE CST
TYPE OF RIVER GAGE ELEVATION OF RIVER GAGE ZERO Ft. FLOOD STAGE Ft. NORMAL POOL STAGE Ft.

DATE	TEMPERATURE F. 24 HRS. ENDING AT OBSERVATION MAX.	MIN.	AT OBSN.	PRECIPITATION 24-HR AMOUNTS Rain, melted snow, etc. (Ins. and hundredths)	Snow, ice pellets, hail (Ins. and tenths)	At Ob. Snow, ice pellets, hail, ice on ground (Ins.)	Draw a straight line (——) through hours precipitation was observed, and a wavy line (~~~) through hours precipitation probably occurred unobserved. A.M. NOON P.M. 1 2 3 4 5 6 7 8 9 10 11 1 2 3 4 5 6 7 8 9 10 11	WEATHER (Calendar Day) Mark 'X' for all types occurring each day. Fog	Ice Pellets	Glaze	Thunder	Hail	Damaging Winds	Time of observation if different from above	RIVER STAGE CONDITION	GAGE READING AT ___ A.M.	TENDENCY	REMARKS (Special observations, etc.)
1				0													
2				0													
3				0													
4				T	T												
5				0													
6				0													
7				0													
8				0													
9				0													
10				0													
11				0													
12				0													
13				0													
14				.10													
15				0													
16				0													
17				0													
18				0													
19				0													
20				.15	.5												
21				T	.5												
22				0	.4												
23				0	.2												
24				0	0												
25				0													
26				0													
27				0													
28				T	T												
29																	
30																	
31																	
Sum			SUM	.25	1.6		CHECK BAR (For wtp weight) NORMAL CK. BAR										

CONDITION OF RIVER AT GAGE
A. Obstructed by rough ice. B. Frozen, but open at gage. C. Upper surface of smooth ice. D. Ice gorge above gage. E. Ice gorge below gage. F. Shore ice. G. Floating ice. H. Pool stage.

READING DATE

OBSERVER Jim Keller

SUPERVISING OFFICE WFO, ABERDEEN, SD

STATION INDEX NO. 39-0350-3